

Section 1 - Executive Summary

On 6 January 2012, Vice Chief of Naval Operations, directed RDML Samuel Perez to assess and review the Navy's readiness to receive, employ and deploy the Littoral Combat Ship (LCS) class vessel. Appendix 001 contains the tasking letter. This report provides the review of the Navy's LCS readiness.

1.1 Systemic Barriers

The systemic barriers in Section 3 of this report are those issues which present the most far-reaching impediments to successful employment and deployment of the LCS program. Within each issue area, barriers may have both short- and long-range impacts on the ability to successfully execute the LCS program. Each must also be viewed as part of a composite picture of "LCS Wholeness," as the findings in one area usually have implications and effects across the rest of the spectrum.

1.2 Singular Barriers

The singular barriers in Section 4 of this report are divided across the DOTMLPF (doctrine, organization, training, maintenance, leadership, personnel, and facilities) spectrum. Each issue must again be viewed as part of a composite picture of "LCS Wholeness," with implications for the other issue areas. While these concerns will not typically have as wide-ranging an impact as the systemic barriers, the Navy must mitigate them to successfully sustain the full 55-seaframe LCS program.

1.3 Overview

In order to determine barriers to LCS' introduction into the fleet, we started by reviewing key LCS tenets. Our review found that many people involved with the LCS program have forgotten key LCS fundamentals. Many have forgotten that the initial two hulls represent significant departures from the normal shipbuilding path; in fact, the focus of the first two ships is to refine concept development, modularity, employment of off-board vehicles and conduct risk mitigation for follow-on flights in the ship class. In essence designers viewed the first two ships as test and evaluation platforms. Innovative from its inception, the LCS program bypassed many of the traditional shipbuilding timelines by taking advantage of available commercial designs. The acquisition strategy sought to quickly produce a seaframe—the hull without the associated combat systems package—and deploy it to the fleet for Sailor experimentation. The goal was to quickly produce a high-speed, modular-mission ship designed to operate in the littorals in support of U.S. maritime objectives. Designers envisioned a fast, shallow-draft ship ideally suited for operations within constrained littoral environments. These characteristics would also enable LCS to forward deploy and engage a broader range of partners than possible with traditional cruiser/destroyer (CRUDES) ships.

Another innovative concept envisioned for LCS was "modularity." With modularity, the Navy designed an ability to exchange the ship's main battery, mission packages (MPs). Each of the MPs would bring a unique capability to the ship. The versatile surface warfare (SUW) MP would be designed for routine littoral operations. The mine countermeasures (MCM) MP would use off-board sensors and vehicles to deliver a mine warfare capability. In the same manner, the

anti-submarine warfare (ASW) MP would employ sensors and helicopters to find and prosecute quiet diesel submarines in the littorals.

Interviews with early LCS designers and requirements officers confirmed that the Navy did not intend LCS to assume the role of a small multi-mission frigate or a "pocket" DDG. Instead, LCS would operate in conjunction with more capable ships in a netted environment providing integrated air and missile-defense. On-board systems would provide LCS with an adequate self-defense capability for most littoral environments. In addition, speed would enable LCS to press the fight when capable and withdraw when required. Embarked aviation assets would broaden LCS' surveillance envelope and provide the ship with an alternate means of expanding the battlespace.

Few innovative concepts are perfect from the start. LCS is no exception. Our review revealed seven areas that require closer alignment with the CNO's Tenets to effectively integrate LCS into fleet operations: the concept of operations, manning, maintenance, modularity, MP capability, training, and commonality.

The first step in "getting LCS right" is to determine the correct concept of operations (CONOPS). The Navy advertises LCS as a replacement for three ship classes: frigates (FFGs), mine countermeasure ships (MCMs), and patrol craft (PCs). Designers believed that LCS' modularity would enable it to adequately perform missions across the wide spectrum of operations performed by the three ship classes. The Navy drafted the initial CONOPS accordingly. This review highlights the gap between ship capabilities and the missions the Navy will need LCS to execute.


There are two options: building a CONOPS to match LCS' current capabilities or modifying the ship to better meet the needs of the Theater Commanders. As stated previously, LCS is not a smaller frigate, but neither was it intended to be solely a patrol boat. In its current design, LCS provides the Theater Commander with focused capabilities in the littorals. It is an ideal partnership asset that can increase U.S. presence in many areas previously inaccessible to our Navy. Planners must take care to assign LCS to appropriate operational areas and missions that closely match the ships' capabilities. The ships' current characteristics limit operations to a greater extent than envisioned by the CONOPS and ROC/POE developers. As configured, LCS' characteristics require the ship to pull into port more frequently to replenish, provide crew rest, and conduct maintenance.

The second option is to modify the ship to support the warfighting requirements. Our review identified opportunities to modify several of the ships' characteristics to more closely align with the intent of the original CONOPS. These modifications also enable LCS to more fully assume the operational roles of the three ship classes.

The current manning construct does not provide enough depth to execute the CONOPS, meet ROC/POE requirements, or support LCS' forward operational concept. At present, LCS manning sacrifices the ships' operational capabilities and systems reliability, and requires senior, qualified Sailors in numbers that many view as unsupportable. The contract maintenance scheme, primarily driven by the low number of assigned Sailors, is inadequate to maintain required systems and seaframe availability, and may place too many operational limits on forward-deployed units.

Originally, designers envisioned modularity as a method to quickly swap-out MPs, providing the ship with a tactical means of shifting from one focused mission to another. Logistics realities, especially those associated with forward-deployed naval forces, indicate that the timeline for an MP exchange will depend largely on in-theater logistics resources and capabilities. The logistics and training challenges tied to conducting MP change-outs leads most operational commanders to predict that ships will retain their embarked MPs for extended periods of time. Modularity remains a highly desirable capability; however, the decision to exchange MPs will more likely be an operational rather than a tactical decision. Given the challenges and timelines associated with an MP change-out, all stakeholders must understand modularity's current limitations.

Meanwhile, the current capabilities delivered by two of the three MPs fall short of the requirements needed to satisfy the CONOPS. The ASW MP comes late. The MCM MP is behind schedule and must overcome a few remaining challenges, but is nearing fleet introduction.



The LCS minimal-manning construct also requires Sailors to be highly trained before they arrive on the ship. In contrast to the approach used aboard most ships, each Sailor qualifies on their watchstation prior to reporting aboard (Train to Qualify – T2Q). Taking training beyond the apprentice-to-journeyman construct found in the fleet, LCS Sailors arrive with journeyman-level skills and integrate as a team, completing their certifications (Train to Certify – T2C) before reporting “on hull” as an integrated unit. Using this construct, the entire crew arrives aboard the ship as a full up round. The requirement to deliver qualified Sailors drives a lengthy training pipeline, in many cases between 18 and 24 months of training before reporting to the ship or team.

Finally, with a view to future ship construction, divergent seaframes and ship systems prevent greater use of economies of scale for equipment, maintenance, and training. Driving to increased commonality will lower costs and increase flexibility in assigning LCS Sailors, who in many cases are not interoperable between variants.

Taking an innovative and forward leaning approach toward the maritime challenges of the future, LCS has the potential to be a remarkable ship and modularity an outstanding asset. However, to meet the CNO's Tenets of “Warfighting First, Operate Forward, and Be Ready,” LCS must address the first six of the aforementioned issues as soon as practical. While not a barrier to initial operations, increasing LCS commonality will: yield economies of scale, increase LCS Sailor interoperability, simplify logistics, and enhance flexibility for operational commanders. Increasing commonality is crucial to creating a more cost-effective and sustainable ship over its lifetime.